

## VAX-11/780 Gains New Winchester Disk, 6,250 b/in Tape Drive

A new fixed-media disk for high-end VAX-11/780 users offers a breakthrough in speed, capacity, and price. With 516 MB of formatted capacity per drive, the RP07 provides the lowest cost per Mbyte, the fastest access time, and the highest transfer rate of all Digital disks.

The RP07 Winchester-type disk equips VAX-11/780 systems to handle vast amounts of data. Combined with the processing power and large virtual address space of the VAX/VMS system, the RP07 is ideal for large database applications that require fast, interactive access.

Digital's new TU78 tape drive, which provides economical 6,250-bit-per-inch capability, is an excellent, performance-oriented companion product for the RP07 disk drive. It is being introduced concurrently to complete a very competitive Digital storage subsystem for VAX users. Particularly significant for commercial customers are the increased number and size of applications and databases which the VAX-based DEC Datasync 700 series can now support.

### RP07 Disk Drive

The RP07 announcement gives Digital customers a choice between the large 256-Mbyte removable-media RM05 disk that was introduced last summer and the fixed-media RP07 drive. Available for



about the same price as the RM05, the RP07 is appropriate where large amounts of online storage are required at the lowest possible price and smallest floor-space. The RM05 remains the disk of choice for applications where the flexibility of a removable disk is paramount. The virtually contaminant-free environment of the sealed head/disk assembly that characterizes Winchester technology enables the RP07's read/write heads to fly one-third closer to the recording surface than is possible with removable media. With the resulting improvement in signal performance, the RP07 has doubled the recording density and storage capacity of the RM05.

(Continued on page 2)

## Digital Shows Networking Skills At NCC '81

Communications is one of Digital's fortes. At the 1981 National Computer Conference (NCC) in Chicago, Digital emphasizes its strength in all marketplaces and reminds its audience that in configuring networks of any type, large or small, remote or local, Digital maintains its leadership.

There is no better evidence of this expertise than Digital's engineering network, whose 120 nodes span two continents. The network includes over 20 VAX systems, many PDP-11s, and a number of DECsystem-10s and DECSYSTEM-20s. This network, which extends from Nashua, New Hampshire to Reading, England, now enters McCormick Place, the site of this year's NCC. The systems at Digital's NCC booth will be online to the engineering net.

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**We change the way the world thinks.**



## VAX-11/780 Gains New Disk, Tape



The excellent reliability of fixed-media disks and the absence of substantial routine maintenance makes it possible to reduce the RP07's basic monthly maintenance charge by one-third, compared to the RM05. That, combined with a cost per Mbyte 45 percent lower than the RM05, makes the RP07's total cost of ownership very attractive.

Packaged with the MASSBUS Device Control Logic in a free-standing cabinet, the RP07 consists of 32 heads flying over nine 14-inch platters. Onboard microprocessors control major drive functions and fault isolation diagnostics.

The RP07 transfers data at an average of 1.3 Mbytes per second. A 2.2 Mbyte-per-second transfer rate is optionally available. At either rate, the RP07 can be mixed with other MASSBUS disks or tape drives, in any combination, up to a total of eight drives per RH780 controller in a VAX system.

Two distinct heads per recording arm and data surface are employed to hold average seek time to 23 milliseconds. Average rotational latency is 8.3 milliseconds and the average access is 31.3 milliseconds.

A single controller with eight RP07s provides over 4,000 Mbytes of online storage. Implied and mid-transfer seeks are conducted by the drive logic without controller interrupts to enhance data throughput on individual or multidrive configurations.

Blocked data transfer and direct memory access are also supported. The dual-

access hardware option enables the RP07 to be accessed by two processors. During the powerup cycle, the RP07's onboard microprocessors perform self-tests to verify drive functionality and to ensure head/disk safety in any fault condition. Microprocessor control of the servo system provides precise head positioning. This contributes to low error rates and eliminates periodic head alignments.

A comprehensive set of microdiagnostics built into the RP07 can be initiated in several ways: offline via the RP07's maintenance keypad, online by the host processor, or online via remote diagnosis. The diagnostics can isolate a defective field-replaceable unit, which can be replaced in an average time of 15 minutes. Error detection and isolation procedures are performed on all data and header information. By constantly checking and logging disk status, the system's software corrects detected errors and recovers data that might otherwise be lost. Bad blocks are automatically flagged and skipped during formatting.

The RP07 drive will be available separately and packaged with VAX-11/780 systems in the United States and Canada this summer; other areas will have them in October.



### TU78 Tape Drive

The TU78, Digital's first 6,250-bit-per-inch tape drive for VAX-11/780 systems, provides the ideal backup for the RM05 disk and the new RP07 disk. For a moderate premium over the TU77, the new drive offers three to four times its density, complementing the features of Digital's large-capacity, high-speed disks.

Writing at 125 inches per second, the TU78 offers program-selectable 6,250- and 1,600-bit-per-inch ANSI-standard densities. These industry-standard formats enable quick, high-volume data exchanges with large mainframes.

In 6,250-bit mode, 145 Mbytes can be stored on a 2,400-foot reel of tape in eight-Kbyte blocks. This is three times the capacity of a tape encoded at 1,600 bits per inch.

The TU77 will continue to be a cost-effective tape drive for applications that do not require the capacity and transfer rates of the TU78.

Maximum transfer rate of the new machine is 781 Kbytes per second at 6,250 bits per inch, and 200 Kbytes per second at 1,600 bits per inch. The top transfer speed provides a four-fold improvement over the TU77.

The data compaction, fast transfer rate, and high data integrity of the new TU78 makes it ideal for high-speed data acquisition, archival storage, journaling, and transaction processing.

The TU78 magtape drive is the first Digital product for VAX-11/780 systems using Group Coded Recording (GCR) technology at the 6,250-bit-per-inch density. GCR encodes Error Correcting Code (ECC), Cyclic Redundancy Check (CRC) characters, and parity bits on the tape.

Phase Encoding (PE), used to record at 1,600-bit-per-inch density, encodes parity bits only. PE and GCR recording techniques enable the TU78's electronics to automatically detect and recover one-track errors at 1,600 bits per inch and two-track errors at 6,250 bits per inch without retrying read operations.

A MASSBUS device, the TU78 interfaces with the VAX-11/780 via the RH780 controller. Up to three add-on drives can be attached to the TU78 subsystem. Dual access can be ordered with the TU78 subsystem or field installed later.

In much the same manner as the RP07 disk, the TU78 is equipped with microprocessor-run diagnostics that continually run self-tests whenever data is not being transferred. In the event of any irregularities, the host CPU is alerted even when the subsystem is in standby mode. This allows the operator to correct the problem before engaging the drive.

The maintenance keypad allows most subsystem functions to be exercised and studied with a few keystrokes. Fault isolation diagnostics help isolate single, field-replaceable units that are accessible in most cases through the front of the drive.

The TU78 will be available separately and packaged with VAX-11/780 systems by the summer in the United States and Canada. International customers will have them in October.

### CORRECTION

The PDP-11/24 (April *Insight*, Page 1) supports COBOL, DIBOL, and INDENT in addition to the other software listed. RPG, however, is not available as an option.



# Remote Diagnosis: The Fault-Finder You're Glad to Call

One of Digital's remote diagnosis centers is in Colorado Springs, Colorado.



Remote diagnosis—an accurate, automated fault-isolation system—is resulting in faster response to problems and increased system availability. Digital's Field Service organization is successfully implementing Remote Diagnosis for all customer applications, including manufacturing, distribution, transportation, and banking.

Working with Digital Diagnosis Centers (DDCs) located in the United States, France, and England, remote diagnosis on PDP-11/44s and PDP-11/70s, VAX-11/750s and VAX-11/780s, DECsystem-10s and DECSYSTEM-20s, and DEC Data-system 540s, 570s, and 700s can usually begin within 15 minutes of the receipt of a customer's call.

Before the development of remote diagnosis, servicing a computer problem meant sending a service engineer to the site to pinpoint the failure, after which the faulty part could be replaced—provided the service engineer had a replacement for the failed part. Not having the necessary part on hand meant a return trip to the service office. To the customer, this meant one thing—longer system downtime.

Now—a customer who utilizes remote diagnosis is guaranteed a 24-hour, seven-day-per-week response line to the DDC, should a system failure occur. Customers, by providing access to their computer, link their system via a voice-grade dedicated phone line to the DDC allowing diagnosis to start.

Results are immediately analyzed. Precise diagnosis of the problem, to the device level, happens within minutes of the customer's call. The DDC can, in some instances, resolve the customer's problem without an engineer having to visit the site.

If onsite service is required, the DDC contacts the local Branch Service office and provides a precise fault description so that a specialist can be dispatched to the site with the correct part in hand. Minimized repair time through advance fault definition is part of Digital's ongoing strategy to improve and perfect service delivery.

Through the DDC, customers can also arrange for remote preventive maintenance programs to be run during off-peak periods. Regular prescheduled checks are arranged so as not to interfere with normal system usage. Diagnostic preventive maintenance programs can identify potential problems before they occur.

Digital has been a pioneer in the innovative technique of remote diagnosis. It remains the most advanced concept for preventive and diagnostic maintenance services in the industry. Our Field Service group totaling nearly 10,000 people is constantly investigating new ways to improve the level of service to all of Digital's customers.



The key on the front panel of this PDP-11/70's console gives fast and easy access to remote diagnosis.

PDP, DECUS, DECnet, DECsystem-10, DECSYSTEM-20, DIBOL, VAX, VMS, and RSX are all trademarks of Digital Equipment Corporation.



## Digital At NCC '81

Large networks like this one support a variety of applications. Various groups in Digital that are responsible for the development of systems and network products use it to test new products and to communicate the results of these product tests among themselves. Information crucial to product development is thus distributed dynamically and on a timely basis to all those involved in ensuring a product's superior quality.

Digital, which designs all of its computer systems with data communications in mind, can also configure small local networks dedicated to specific applications. Both types of networks, large and small, are intended to achieve one goal—the efficient management and use of information, by means of which data is available to people when and where they need it.

Digital is, therefore, concerned with developing new networking technologies that will further improve information management. Digital's venture with Xerox and Intel in developing Ethernet, the local network specification, is the latest evidence of our continuing involvement in innovative communication capabilities. At NCC, Digital will demonstrate Ethernet capabilities.

Digital's display of products at the National Computer Conference (NCC) highlights our networking expertise and wide range of interactive equipment in the commercial, technical, small business and office markets.

Digital's NCC booth features the VAX-11/780, regarded as the industry standard of state-of-the-art computer architecture; two VAX-11/750 systems, representing the newest, smaller-size VAX system; the PDP-11/24, Digital's newest PDP-11, with UNIBUS architecture and memory expandability up to an Mbyte; the RP07, a new 516 megabyte Winchester disk, and the TU78, a 6,250 bits-per-second tape drive.

Digital will also demonstrate the DEC Datasystem 315, a small business system based on the PDP-11/23; graphics terminals like the VS11, a high performance color graphics terminal, and the recently announced GIGI, a low-cost, versatile graphics terminal supported by several

*Digital's engineering network of 120 nodes, which spans two continents, now enters McCormick Place, the site of this year's NCC.*

Digital operating systems; and both personal and departmental word processing systems that emphasize Digital's commitment to creating efficient offices.

### Networking

Visitors of Digital's NCC booth will be able to access Digital's engineering net from over 25 terminals, including a number of VT100s and GIGIs. Certain nodes in the network will have public guest accounts, but other nodes in the network will not be accessible to general users.

Digital is universally recognized as a pioneer in distributed systems and networking. With our interactive and compatible systems, and network products, distributed data processing is possible in virtually any environment: technical, commercial, manufacturing and process control. DECnet, Digital's network communication software, allows large numbers of systems from Digital to be linked to share programs and files, thereby substantially reducing the cost of software development and maintenance.

The increasing sophistication of DECnet products is testimony to Digital's investment in the development of improved technologies. Digital's policy of upward migration from an older to a newer version of any product is indicative of the corporation's concern for its customers' investments in its equipment. For example, DECnet Phase III, to be demonstrated at NCC, has upward compatibility with Phase II.

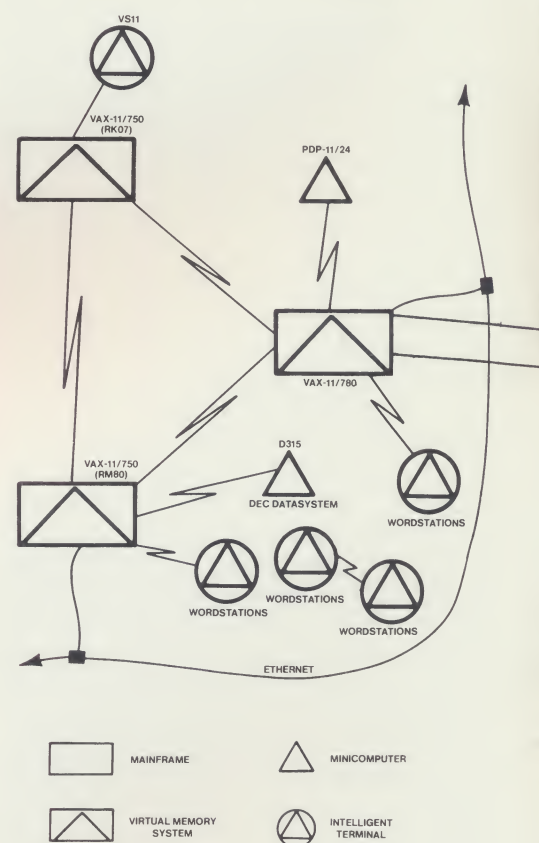
Phase III, the most recent version of DECnet, has the adaptive routing feature and network management utilities that distinguish it from DECnet Phase II. Adaptive routing permits non-adjacent nodes to communicate and eliminates the necessity for direct physical lines between two communicating nodes. For instance, the Digital systems on the NCC floor that are linked to the engineering net do not have direct physical lines to every other node with which they communicate. Adaptive routing also ensures that if any line in the network is disabled, the data to be transmitted is rerouted through another path in the network *transparently to the user.*

*Visitors will be able to access the engineering network from over 25 terminals on the NCC floor.*

Transparent rerouting and network management together greatly enhance the reliability of a network. The network manager of a DECnet Phase III network can perform line loopback tests from a central command terminal and monitor the status of all the nodes in the network.

Distributed systems permit users to derive the benefit of local computing facilities (like running a department specific program) and, at the same time, partake of the extensive resources of a central data facility (for example, the database at headquarters in a large corporation).

NCC NETWORK CONFIGURATION



Digital's systems at NCC can access



*Digital's display of products at the National Computer Conference (NCC) highlights our networking expertise and wide range of interactive equipment.*

*Digital's venture with Xerox and Intel in developing Ethernet, the local network specification, is the latest evidence of our continuing involvement in innovative communication capabilities.*

Fast, easy, and accurate information exchange among the various departments of an organization contributes significantly to increased operating efficiency. Digital's interactive systems and network products ensure that a user can easily access information from remote systems when needed.

Digital's systems communicate not only with other systems from Digital but with systems from other vendors. Digital's Internet software products enable Digital's systems to be connected with systems from IBM, Control Data Corporation and Sperry Univac.

The X.25 Packetnet System interfaces support the connection of Digital's systems to public packet-switched networks.

### Office Equipment and Small Business Systems

The cost accounting and order processing program running on the DEC Data-system 315 at NCC illustrates how a small network can cost-effectively run a dedicated application.

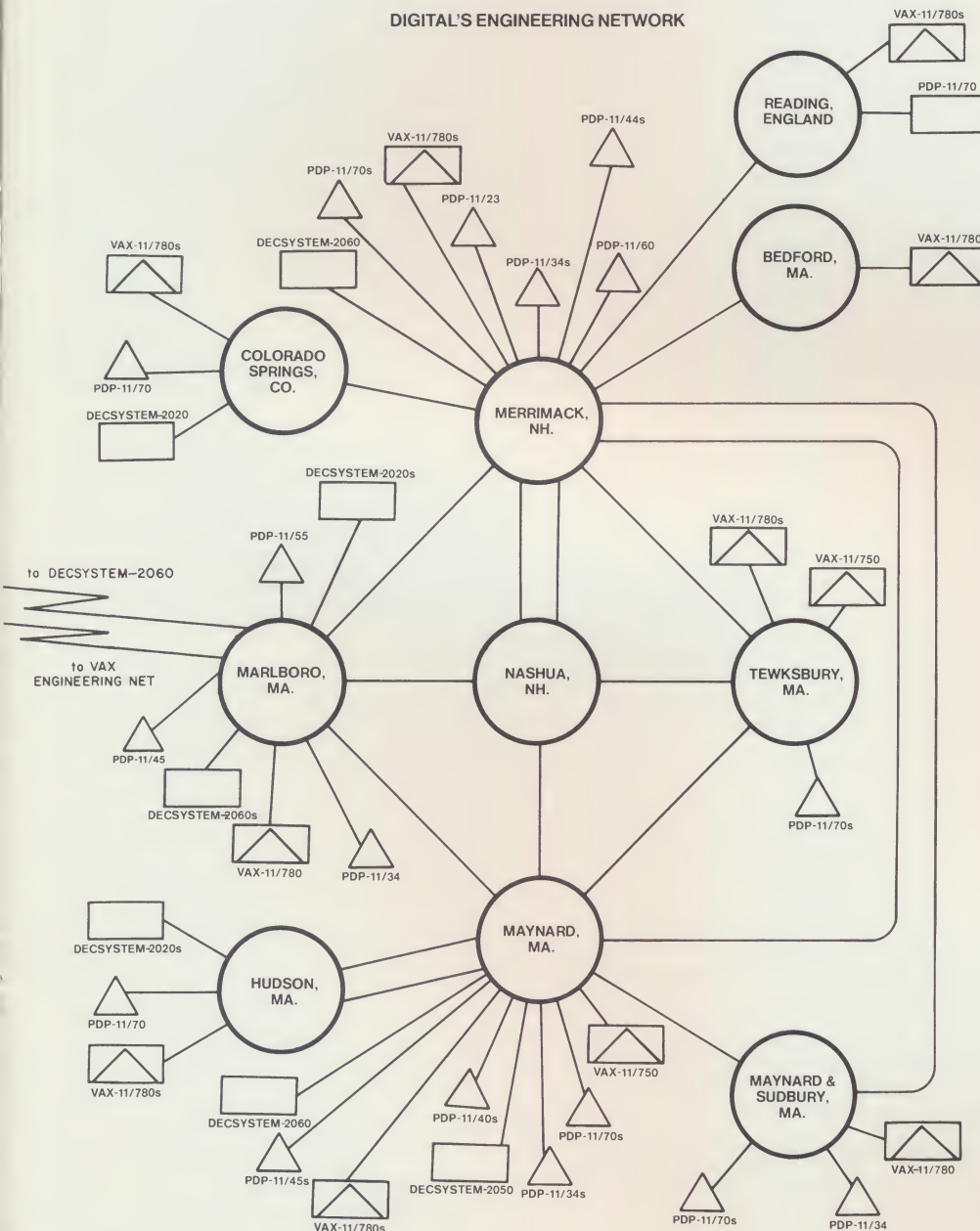
Like all of Digital's word processors, those on display at NCC can communicate with other Digital word processors and with host computer systems. They can transmit documents in word processing format with all word processing features (underlining, boldface, page numbers, page markers, page layout) unaltered between Digital word processors in different geographical locations.

Unattended word processing stations can also receive documents from other word processors, a feature that is particularly useful when transmitting documents between word processors in different time zones.

Digital's word processors and small business systems enable small businesses and individual departments within large organizations to operate efficiently. Our commitment to offices extends further than supplying office automation equipment; Digital is interested in creating an office environment in which various types of office equipment are linked together in local and remote networks that reduce information duplication and make possible the easy retrieval of available information by those who need it.

Networks enable efficient information management. At NCC, Digital demonstrates how.

DIGITAL'S ENGINEERING NETWORK



Digital's own intercontinental engineering network of over 120 nodes.

### Note to DECUS Members

Digital's NCC demo and display of products will be repeated at the next symposium of the Digital Equipment Computer Users Society (DECUS) to be held between May 18 and 21, 1981, in Miami, Florida.



*Seymour Brooks of Citibank  
considers Digital's DECsystems  
"the most cost-effective time-  
sharing machines around."*

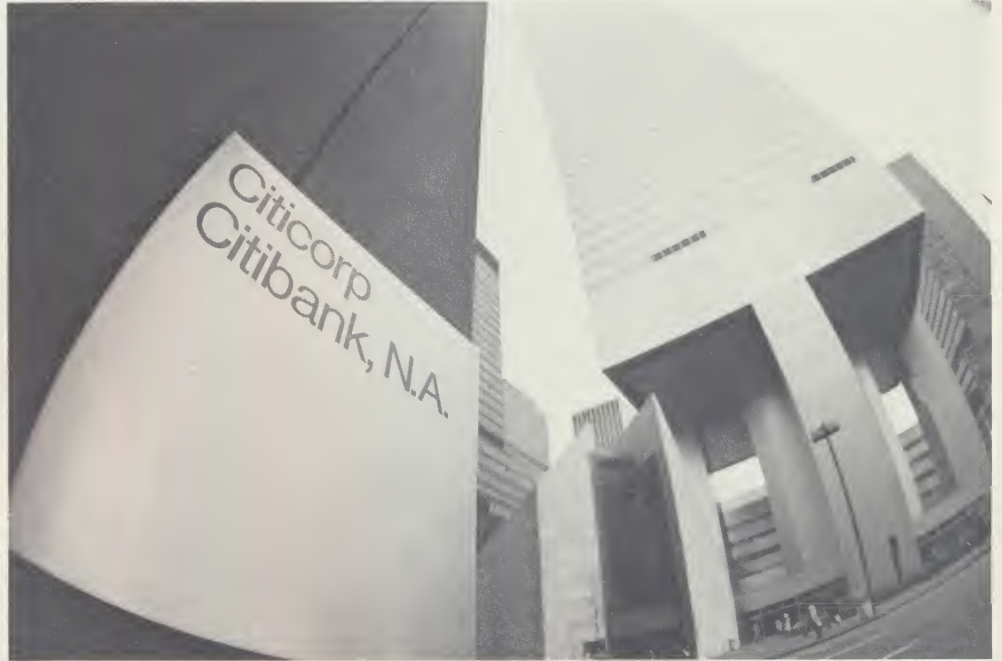
## New York City Bankers Choose DECSYSTEM-20s And Inhouse Timesharing

Purchasing computer time from an outside timesharing service can be costly. Purchasing a computer is also expensive, but, at the same time, it's a capital investment.

There are technical and financial considerations—like the present and projected workload. How much work is being sent to outside services, and which of those applications can be done inside? Can existing programs that are run on the outside be economically converted to an inhouse system? Is the predicted future growth rate of interactive computing significant enough to warrant an inhouse investment?

If outside timesharing usage is growing every day, a decision regarding the amount of interactive computing to bring inhouse versus leaving it as is can be a study in itself. Some institutions have brought the majority of their existing applications inside, while others have decided to simply add any new users to their inside system.

Seymour Brooks of Citibank



These are but a few of the important points to be taken into consideration before switching to inhouse timesharing. If outside timesharing costs are becoming financially prohibitive for your company, you'll be interested in how three separate New York City banks found solutions to that same problem. Two made the switch to inhouse timesharing within the last two years. One saw its needs changing 13 years ago.

### Citibank

Citibank can be considered a pioneer in inhouse timesharing, having made the choice to go that route 13 years ago. Citibank was spending in the neighborhood of \$25,000 per month for outside timesharing services in 1968. Making a radical decision at the time, Citibank chose to set up its own inhouse timesharing service and purchased one of the first DECsystem-10s manufactured for commercial use.

The value of inhouse timesharing was instantly recognized by Citibank. Assistant Vice President Seymour Brooks considers Digital's DECsystems "the most cost-effective timesharing machines around."

By September of 1971 the use of inhouse resources had grown so significantly that the online storage and memory capacity of the DECsystem-10 reached its limit. Citibank was faced with the choice of either buying timesharing from an outside vendor or purchasing another DECsystem-10.

The decision was clear; Citibank named their two DECsystems Citishare I and Citishare II. The second DECsystem-10 provided users with the additional resources they needed as well as a backup computer.

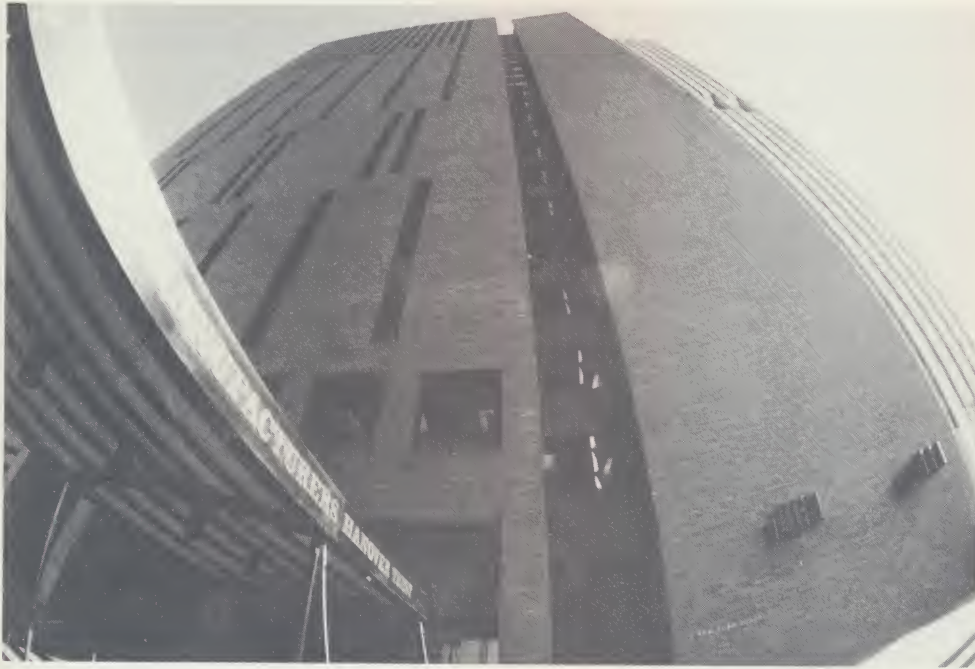
According to Brooks, in addition to dollar savings, the users of the DECsystem-10s found themselves in possession of a tool that was available 24 hours a day for development. "The operating system is a wonderfully useful tool. It's very user-oriented. If you take a nontimesharing person and introduce him to our timesharing, he loves it. If you take a timesharing person and introduce him to TOPS-10 or TOPS-20, he loves it. It just keeps getting better."

Although the early '70s was just the beginning of inhouse timesharing for

*(Continued on page 9)*



*Robert Tanner of Manufacturers Hanover Trust says DECSYSTEM-20s were chosen over the competition "because of the friendliness and end-user orientation of the operating system software."*



#### **Manufacturers Hanover Trust**

When outside timesharing costs were totaling well over one million dollars a year, upper management at Manufacturers Hanover decided it was time to find a more cost-effective solution. Each aspect of the problem was studied in detail.

An evaluation of three major alternatives—consolidating down to a few of their "preferred vendors," a facilities management arrangement with one vendor that involved buying a computer and having the vendor run it, and the inhouse facility solution—led to Manufacturers' decision that, in terms of cost, safety of the data, and responsiveness to the users, an inhouse system was the best overall solution.

Many of the bank's departments had been purchasing outside computer time from several vendors. Manufacturers requested each vendor to send invoices to a central group within the bank, so that they could monitor what the bank as a whole was spending on each vendor and what the overall expenditure was on each group.

Analysis of the data showed costs were on the rise each month and that each group within the bank was using fairly standard database and financial packages that could be easily duplicated in a private environment. A survey was then conducted among all timesharing users to determine types of work, software used, and databases referenced.

Next, the bank investigated hardware and software that was available in the market. From this study they determined that, in terms of software, two basic packages were needed—a user-oriented data management system and a financial modeling system.

Assistant Secretary Robert Tanner, the officer in charge of the Interactive Computing Facility at Manufacturers Hanover, explained that an outside consultant did a hardware study for them that narrowed their choices down to a few specific vendors.

"We looked at six or seven hardware vendors and eventually narrowed the choice down to Digital Equipment Corporation. Each one had strengths and weaknesses, but Digital was chosen

because of the friendliness and end-user orientation of the operating system software. We felt that the TOPS-20 operating system would be very beneficial for non-technical users."

A corresponding study and selection process was done to determine which third-party software packages would best suit Manufacturers Hanover's requirements. "Our original intent was to teach the users software packages so that they could develop their own applications and not have to rely on technical people for assistance. We had been developing programs for our users of outside timesharing until we got our own equipment.

"We are continuing to do program development for some of our inhouse users, but there are many who are doing their own. They're learning the software packages that we have and using them as management tools for applications such as reporting and financial modeling."

Manufacturers Hanover's first DECSYSTEM-2050 was delivered in April of 1979. According to Tanner, "the installation went very smoothly, with the system up and running on May 1st. In August of '79 we purchased our DECSYSTEM-2060, and it was up by October. In that same month, we upgraded our 2050 to a 2060. Right now, we have 512K (36-bit) words of memory on each system, which will shortly be upgraded to 768K on each. We plan to upgrade that to one megaword on each DECSYSTEM."

*(Continued on page 9)*

**Robert Tanner of  
Manufacturers Hanover Trust**





*Robert Berger of Bankers Trust is pleased with the way "people are using their college FORTRAN, picking up manuals, and learning to do things on their own. We are quite happy with the productivity."*

### Bankers Trust

At Bankers Trust the planned increase in both the amount of computing done outside and the price for that service was reaching unacceptable levels. After careful feasibility and selection studies, plus close observation of other firms that had switched to inhouse timesharing, Bankers Trust, in April of 1979, decided to purchase a DECSYSTEM-2060.

Assistant Vice President Robert Berger explains. "The DECSYSTEM-20 user community that we spoke to was basically New York City commercial firms. One factor in our selection of a DECSYSTEM-2060 was that all these users were very happy with DECSYSTEM-20s. The significant New York-based successful commercial usage of the system was quite reassuring.

"We at Bankers Trust have been dealing with Digital Equipment Corporation on PDP-11s for about four years now. We're familiar with Digital's Field Service and Sales. We felt comfortable with Digital.

"Another factor was a competitive price. But the primary reason for choosing a DECSYSTEM over any other is that it is user-friendly. We felt that any of our users would be able to quickly learn this system. We also felt that any new employees who had no timesharing experience could easily use this system."



Robert Berger of Bankers Trust



Bankers' reasoning proved to be correct; they found that employees who were previously unfamiliar with the DECSYSTEM-20 became productive very quickly. Berger added, "The thing that really surprises me is the amount of non-data-processing people who are doing their own work, as opposed to having a computer department do the work for them. There are many people using their college FORTRAN, picking up manuals, and learning to do things on their own. We're quite happy with the productivity."

The high demand for the inhouse system was also unexpected. According to Berger, the estimated usage growth rate was small. "We planned for the conversion of our outside applications and we predicted our inhouse growth rate to parallel the rate we were already experiencing outside. We honestly had estimated a 25-percent-per-year internal growth. What we are seeing is more like a 10-percent-per-month growth—far beyond what we had anticipated."

Bankers' DECSYSTEM-2060 has 512K words of memory with another 512K on order to double memory size. The system has 10 RP06 disk drives, two TU45 tape drives, three LP series line printers, and 64 communication ports.

The computing costs at Bankers Trust have been reduced to one quarter what they would have spent had the same work been done outside. The inhouse rate structure has been set at a break-even point. Benchmark comparisons indicate that these rates are one-fourth of those charged by outside vendors.

A crucial concern of any bank is, of course, protection of their data. Berger says that financial institutions are not only looking for a more economical computing solution, "but one that will give them more control over their own records. There is always a certain security risk in putting all your financial data out there. With your system located privately inhouse, only authorized persons can gain access to the data."



## RSX-11M, M-PLUS Support 2780/3780

RSX-11M and RSX-11M-PLUS customers can now easily exchange batch-oriented communications with IBM mainframes using the newest version of the RSX-11 2780/3780 Emulator.

Expanding the 2780 Emulator previously available on RSX-11M, the new emulator offers users the advantages of the more efficient 3780 protocol. By making RSX communications appear to originate from either an IBM 2780 or 3780 remote batch terminal, the emulator provides links to IBM 360/370 or 303x processors or other computer systems that support standard 2780/3780 point-to-point BISYNC protocols.

New fault-isolation aids, multiple line support, and modes for attended or unattended operation improve the functionality of the RSX-11 2780/3780

Emulator. Support for the LSI-11 bus has been added to the new version so it can be used with PDP-11/23 systems.

Like the RSX-11 3271 interactive protocol emulator, the RSX-11 2780/3780 batch-oriented software can coexist with DECnet. The two packages round out bisynchronous communication products for use with IBM systems. Communication with IBM networks is provided by the RSX-11M SNA Emulator.

Digital's protocol emulators are designed for users who wish to maintain a centralized data storage facility while increasing local productivity—a benefit of distributing applications on Digital systems. With the RSX-11 2780/3780 Emulator, files can be conveniently moved from the host to update local databases and local data collected during business hours can be passed back to update the central database.

A user will probably choose attended operation when running in production

mode, designing an application, or performing occasional data transfers. The "conversational" interface prompts the user through the command sequence in a way that makes even an inexperienced user comfortable with the product.

Unattended operation, coupled with the autoanswer feature, allows the system to transfer data when no operator is present. An IBM system can call when communication costs are low and can perform previously defined data transfers. The emulator also includes error-recovery features to allow automatic restart and retransmission after a failure.

Up to four users can establish multiple links to the same IBM system or single links to multiple IBM systems. The maximum transmission speed can reach 9,600 baud, depending on data transfer requirements and system loading.

The RSX-11 2780/3780 V 4.0 is available now for RSX-11M systems running V 3.2 or RSX-11M-PLUS using V 2.0.

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### Citibank

Citibank, their Citishare system, at the time, was providing timesharing resources that, if measured against outside resources, would have equalled over a million dollars a month.

Today, the Citishare system comprises four large systems—two DECsystem-10s and two DECSYSTEM-20s. Citishare services about 600 internal users running report-gathering applications, data processing, mathematical modeling, and forecasting.

Owing to the success of Citishare's inhouse timesharing, the firm decided in 1976 to sell its excess timesharing resources to outsiders. Subsequently, Citishare has assisted many converts to inhouse DECSYSTEM-20 timesharing. Citishare provides DECSYSTEM-20 resources to begin the software conversion as well as consultation services on the *dos* and *don'ts* of inhouse timesharing.

They advise companies making the inhouse switch to begin software conversion early. Brooks feels it's very important to install a number of production applications as soon as the computer is installed. "Many of our customers have taken a 'dumper' tape of their files, loaded them onto their own computer, and told their users to dial a new phone number—it was that simple."

Regardless of the amount of time that your inhouse system has been in operation, much of its success has to do with the quality of support services it is able to provide. Speaking from experience, Brooks says it's essential that the inhouse community view those services as being competitive with those of a commercial vendor.

"Users have to be able to get questions answered, submit input, receive output, and have operator services performed in a timely manner. If a user can't get acceptable services inhouse, he will move out of house, no matter what the cost difference."

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### Manufacturers Hanover Trust

Each of Manufacturers' DECSYSTEM-20s currently supports six 188 Mb disk drives, two tape drives, one lineprinter, and 48 terminal ports.

Every addition and memory upgrade was anticipated and planned for by Tanner and his staff, but he admits that one underestimated area was the number of users that would take advantage of the inhouse facility.

"We certainly didn't expect usage to grow as much as it has. For example, during 1980, the number of active users increased from approximately 160 in January to almost 250 by December."

To date, Manufacturers Hanover has brought inhouse approximately \$100,000 in monthly outside expenditures and has plans to convert a substantial portion of its remaining outside timesharing costs—approximately another \$50,000 to \$75,000 per month.



## DSM-11 Adds Terminals, Online HELP Feature

Version 2.0 of Digital Standard MUMPS (DSM) has been enhanced to support additional terminals on a broader range of processors. New online HELP documentation plus streamlined system installation and generation procedures continue to make the PDP-11-based MUMPS system easier to use and maintain.

DSM-11 is the standalone PDP-11 system that uses MUMPS as both a high-level interpretive language and its own operating system. It provides a dynamic database system especially suited to the medical marketplace where variable-length string data (such as billing and medical records) needs to be stored efficiently and updated easily.

Version 2.0 increases the maximum number of terminals configured on a PDP-11/70 from 80 to 128. Up to 63 of these can be used simultaneously. New configurations using extended memory options on a PDP-11/44 can support the same number of terminals and users.

A minimum system with three to 16 terminals is now available using Digital's microcomputer system, the PDP-11/23. DSM-11 is also expected to be approved for the new PDP-11/24 processor when field tests are completed.

Mixed disk controllers are now supported on all systems running the new version. Additional enhancements enable transparent journaling to disk as well as to tape. Disk preparation, backup, and restore are now performed online.

Expanded HELP documentation replaces written documentation for all utilities and system generation procedures. By typing question marks, users can receive online system information in progressive levels of detail.

These enhancements make DSM-11 a versatile database management system for the medical community and for many industrial applications, such as inventory control.

DSM-11 provides a sophisticated disk record management system that is transparent to the user. All data is referenced symbolically through special variables called "globals." Hierarchically organized arrays of subscripted globals form a common database that can be referenced and updated by one or more users of the system.

More than half of all MUMPS users employ Digital's DSM-11 systems or VAX/VMS systems that now offer DSM as a native-mode language. Digital is committed to supporting new hardware and software for DSM's growing customer base.

## SB11 Controller Series Offers Complete Systems In Component Price Range



The SB11 in front of the operator controls the flow of plastic milk containers at this Massachusetts dairy.

The SB11 series is Digital's new line of microcomputer-based controller systems for technical OEM applications. For a price typically found on microprocessor components, you can now get a complete system that teams LSI-11 hardware technology with a unique memory-resident operating system.

Housed in a compact (13"W x 11"D x 4"H) and durable metal box, the SB11 does not require a bulky and more expensive 19" cabinet. Each model in the SB11 series can be mounted at any angle, on a table top, or embedded in an OEM's end product or process. Cost- and space-conscious OEMs can now develop new microcomputer applications utilizing the full PDP-11 instruction set and at the same time have an upward growth path compatible with the entire PDP-11 family.

The SB11 series is designed to handle a wide range of technical OEM controller requirements. For applications requiring greater functionality than is found on a single board computer, i.e.; process and device control, instrument monitoring, communications and network control, the new SB11 series is Digital's sensible and economical solution.

The SB11 series includes a low cost kernel configuration that allows the OEM to add I/O to meet unique user requirements, as well as several preconfigured models tailored to specific applications.

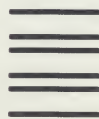
All models include a four slot backplane, the LSI-11/2 (PDP-11/03) CPU, a multi-function memory board containing 32KB of RAM, two serial line ports, sockets for ROM boot chips, and real-time clock. Like the larger PDP-11 minicomputers, the CPU contains over 400 instructions and a 16-bit word length.

Also included with each SB11 is a right to copy (DZ) license for the MRRT-11 (memory resident RT-11) run-time system specifically tailored for the SB11. MRRT-11 allows up to eight SB11s to be line loaded from an RT-11 host system without the need of a local mass storage peripheral. Alternately, MRRT may be loaded from an optional TU58 tape cartridge.

Programs written in FORTRAN IV and MACRO-11 are supported by the MRRT-11 executive. Once built on a RT-11 host, a complete application program can be downline loaded into a maximum of eight SB11s through serial communication lines.

The SB11 is designed for the OEM market and is an exclusive offering of Digital's Technical OEM group. Quantities are available for immediate delivery in the United States and Europe only.



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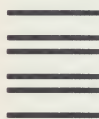
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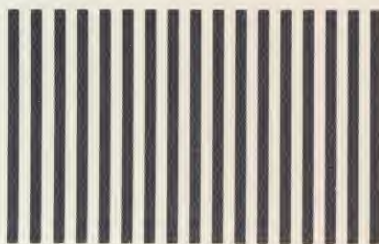
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## Most Advanced VT173 Makes All The News Fit to Print

Newspaper editors can now edit and size their copy with the industry's fastest, most versatile terminal. Designed for Digital's text management systems, and equipped with a large internal memory, the microprocessor-based VT173/E provides instant copy-sizing and editing, using PDP-11/70-based TMS-11 and EMS-11 systems.

Joining recently introduced VT173/R and VT173/C terminals optimized for reporters and classified ad takers, the VT173/E offers editors the highest functionality of Digital's video terminals.

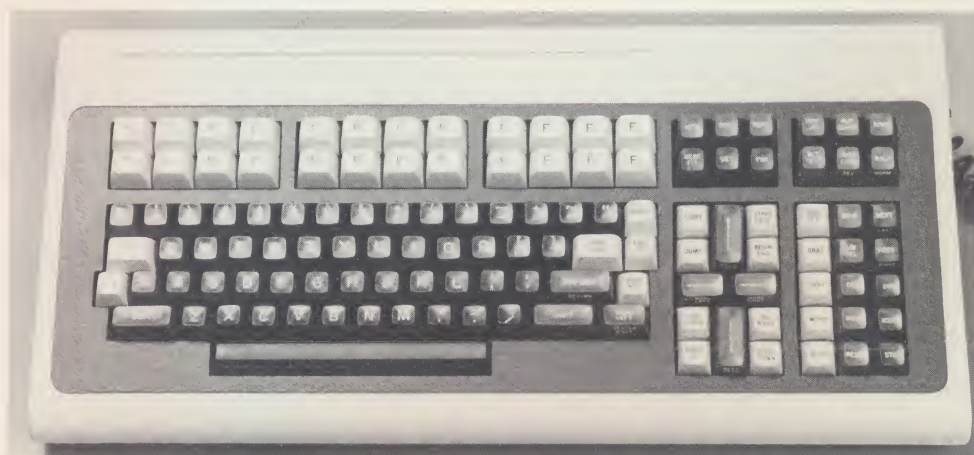
A 56 Kbyte internal memory enables the terminal's LSI-11/2 microcomputer to perform the most complex editing functions instantly—without intervention from the host computer. An extensive keyboard with 123 keys provides all standard editing and cursor movement functions, including 48 user-definable keys (UDKs).

Each UDK can store and recall user-selected segments of text, markup directions, editing functions, or host computer commands. The key definitions are downline-loaded from the host computer, enabling editors to create and modify their own personal sets.

Both the editor and reporter versions of the VT173 contain their own interactive copy size estimator. The status key will display how many characters are in the text and how many column-inches it represents according to markup style.

All members of the VT173 family are built on the same reliable display monitors used in Digital's VT100s. They have multiple-character display modes in common with the VT100, including bold, underline, and reverse video. Additionally, all VT173 keyboards plug into the monitors easily and can be swapped to facilitate service either onsite or offsite.

VT173/E terminals will be available in all areas this summer. VT173/R and /C are available now.





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